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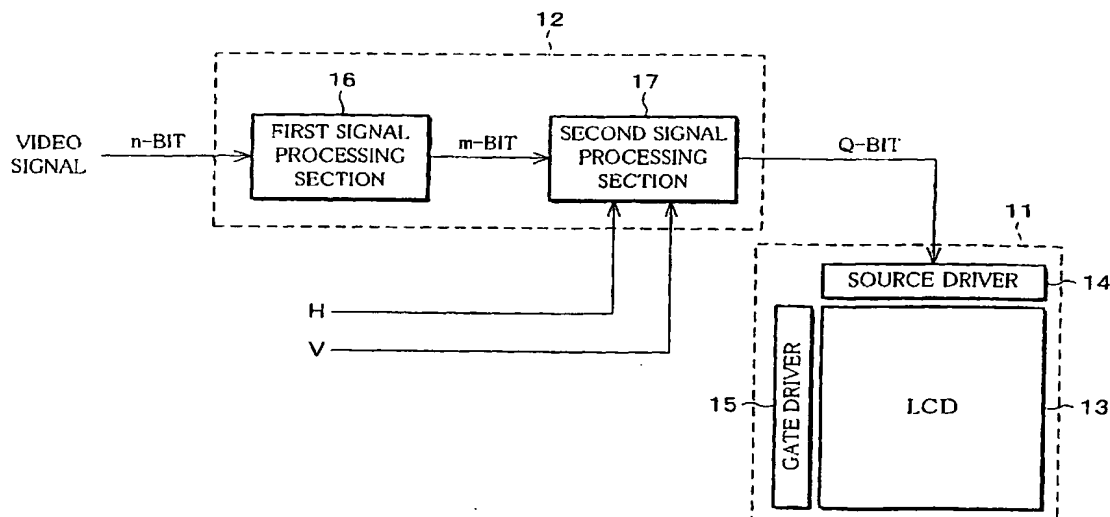
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(54) **Image processing apparatus and image display apparatus using same**

(57) An image processing apparatus of the present invention comprising (a) a first signal processing circuit for applying gamma correction to an n-bit (n : a natural number) digital signal inputted as a video signal and for converting the n-bit digital signal into an m-bit ($m > n$, m : a natural number) digital signal, and (b) a second sig-

nal processing circuit for adding a noise signal, which is used for pseudo contour reduction, into the m-bit digital signal from the first signal processing circuit and for outputting a Q-bit (Q : a natural number) digital signal, which is obtained from rounding off a less significant ($m - Q$) bit ($Q \leq n$) from the m-bit digital signal, to a display section.

FIG. 1



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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	EP 0 981 127 A (TEXAS INSTRUMENTS INC) 23 February 2000 (2000-02-23)	1,8,10, 11,16,17	H04N5/202 G09G3/20
Y	* abstract *	2-7,9, 12-15	
	* paragraph [0005] *		
	* paragraphs [0031]-[0047]; figures 1-5 *		
	* paragraph [0056] *		
	* paragraph [0065]; figures 6,7 *		

X	EP 0 427 524 A (GRASS VALLEY GROUP) 15 May 1991 (1991-05-15)	10,16	
	* abstract *		
	* column 1, line 4 - line 24 *		
	* column 3, line 1 - line 3 *		
	* column 3, line 46 - column 5, line 18; figures 2-5 *		

Y	EP 0 883 103 A (THOMSON MULTIMEDIA SA) 9 December 1998 (1998-12-09)	2-4,12, 14,15	
	* abstract *		
	* column 1, line 23 - line 30 *		
	* column 1, line 56 - column 2, line 11 *		
	* column 2, line 29 - column 3, line 5; figures 1,2 *		
	* column 3, line 27 - line 46 *		
	* column 4, line 5 - line 14 *		

Y	EP 0 662 774 A (TEXAS INSTRUMENTS INC) 12 July 1995 (1995-07-12)	5	
A	* abstract *	4	
	* column 2, line 7 - line 10 *		
	* column 4, line 41 - line 43; figure 3 *		
	* column 5, line 30 - line 33; figures 4-6 *		
	* column 7, line 12 - line 35 *		
	* column 10, line 58 - column 12, line 35; figures 11-13 *		

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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 7 October 2003	Examiner Corsi, F
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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Application Number
EP 01 30 2529

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
D,Y	US 6 040 876 A (PETTITT GREGORY S ET AL) 21 March 2000 (2000-03-21) * abstract * * column 1, line 23 - line 32 * * column 1, line 60 - line 61 * * column 2, line 44 - column 3, line 52; figures 1-3 * * column 4, line 38 - line 53; figure 5 *	6,7	TECHNICAL FIELDS SEARCHED (Int.Cl.7)
Y	US 5 691 821 A (HIEDA TERUO ET AL) 25 November 1997 (1997-11-25) * abstract * * column 1, line 5 - line 17 * * column 1, line 42 - line 45 * * column 11, line 32 - column 12, line 34; figures 15-18 * * column 15, line 13 - column 16, line 45; figures 21-27 *	9	
Y	US 5 359 342 A (NAKAI SEIJI ET AL) 25 October 1994 (1994-10-25) * abstract * * column 1, line 20 - line 30 * * column 3, line 66 - column 4, line 16 *	12,13	
A	DE 299 10 177 U (KONINKL PHILIPS ELECTRONICS NV) 21 October 1999 (1999-10-21) * abstract * * page 1, line 2 - line 19 * * page 2, line 3 - line 14 * * page 2, line 30 - line 34 * * page 3, line 19 - line 24; figure 1 *	1,10,11, 16,17	
The present search report has been drawn up for all claims			
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EPO FORM 1503 03.02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 01 30 2529

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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07-10-2003

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0981127	A	23-02-2000	EP 0981127 A1	23-02-2000
			JP 2000075845 A	14-03-2000
			KR 2000017334 A	25-03-2000
			US 6310591 B1	30-10-2001
EP 0427524	A	15-05-1991	US 4965668 A	23-10-1990
			DE 69016591 D1	16-03-1995
			DE 69016591 T2	24-08-1995
			EP 0427524 A1	15-05-1991
			JP 2010225 C	02-02-1996
			JP 3185515 A	13-08-1991
			JP 7031589 B	10-04-1995
EP 0883103	A	09-12-1998	EP 0883103 A1	09-12-1998
			JP 11065537 A	09-03-1999
EP 0662774	A	12-07-1995	CN 1119396 A	27-03-1996
			EP 0662774 A1	12-07-1995
			JP 8046897 A	16-02-1996
US 6040876	A	21-03-2000	JP 9185707 A	15-07-1997
US 5691821	A	25-11-1997	JP 6177757 A	24-06-1994
			JP 6189178 A	08-07-1994
			JP 6197272 A	15-07-1994
US 5359342	A	25-10-1994	JP 2512152 B2	03-07-1996
			JP 3018822 A	28-01-1991
			JP 3040674 A	21-02-1991
			DE 69022891 D1	16-11-1995
			DE 69022891 T2	15-05-1996
			EP 0403268 A2	19-12-1990
DE 29910177	U	21-10-1999	DE 29910177 U1	21-10-1999
			JP 2000029428 A	28-01-2000
			KR 2000006221 A	25-01-2000
			US 2003133045 A1	17-07-2003

EPO FORM P0459

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